

Claims

1. A fuel injection system for an internal combustion engine, having a high-pressure pump (14) that delivers fuel at high pressure to an accumulator (16), having a fuel supply pump (12) that delivers fuel to the suction side of the high-pressure pump (14), having a fuel metering unit (36) that is provided between the fuel supply pump (12) and the high-pressure pump (14) and is able to variably adjust the fuel quantity taken in by the high-pressure pump (14), having at least one injector (20) that is connected to the accumulator (16) and injects fuel into the engine, and having a return (24) from the at least one injector (20), characterized in that the fuel return (24) from the at least one injector (20) feeds into the connection between the fuel supply pump (12) and the fuel metering unit (36), a connection (40) controlled by a pressure valve (42) leads from the fuel return (24) to a discharge region (10), and the high-pressure pump (14) only draws fuel from the fuel return (24) in operating states in which the fuel quantity delivered by the fuel supply pump (12) is less than the required intake quantity of the high-pressure pump (14).

2. The fuel injection system according to claim 1, characterized in that the high-pressure pump (14) draws from the fuel return (24) only the difference between its required intake quantity and the fuel quantity delivered by the fuel supply pump (12).

3. The fuel injection system according to claim 1 or 2, characterized in that the branch-off point of the connection (40) leading from the fuel return (24) to the discharge region (10) is disposed spaced apart from the outlet of the fuel return (24) into the connection between the fuel supply pump (12) and the fuel metering unit (36), which spacing yields a fuel return

segment (24a) between the outlet of the fuel return (24) and the branch-off point of the connection (40) leading to the discharge region (10).

4. The fuel injection system according to one of claims 1 through 3, characterized in that a bypass line (44) to a drive region of the high-pressure pump (14) branches off from the connection between the fuel supply pump (12) and the fuel metering unit (36).

5. The fuel injection system according to claim 4, characterized in that between the fuel metering unit (36) and the branch-off point of the bypass connection (44), the fuel return (24) feeds into the connection between the fuel supply pump (12) and the fuel metering unit (36).

6. The fuel injection system according to claim 4, characterized in that between the fuel supply pump (12) and the branch-off point of the bypass line (44), the fuel return (24) feeds into the connection between the fuel supply pump (12) and the fuel metering unit (36).

7. The fuel injection system according to one of the preceding claims, characterized in that the suction side of the fuel supply pump (12) is preceded by a filter (30) and/or the pressure side of the fuel supply pump (12) is followed by a filter (30) and, downstream of the filter (30), the fuel return (24) feeds into the connection between the fuel supply pump (12) and the fuel metering unit (36).

8. The fuel injection system according to one of claims 1 through 6, characterized in that the suction side of the fuel supply pump (12) is preceded by a filter (30) and/or the pressure side of the fuel supply pump (12) is followed by a filter (30) and, upstream of the filter (30), the

fuel return (24) feeds into the connection between the fuel supply pump (12) and the fuel metering unit (36).

9. The fuel injection system according to one of the preceding claims, characterized in that the fuel supply pump (12) has an electric drive unit.

10. The fuel injection system according to one claims 1 through 8, characterized in that the fuel supply pump (12) is mechanically driven by the internal combustion engine or by the high-pressure pump (14).

11. The fuel injection system according to one of the preceding claims, characterized in that the at least one injector (20) has a pressure boosting unit (21) disposed on it, from which the fuel return (24) leads.